

WATER-BASED COLLOIDAL COMPOSITION FOR PREVENTING DENTAL CARIES

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OCT 31 2007

Bibliographic Fields

Publication number: JP62019506
 Publication date: 1987-01-28
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 Classification:
 - International: A61K6/00; A61K8/10; A61K8/04; A61K8/21; A61K8/73; A61K8/97; A61Q11/00; A61K6/00; A61K6/10; A61K8/04; A61K8/19; A61K8/72; A61K8/96; A61Q11/00; (IPC1-7): A61K6/00; A61K6/10
 - European:
 Application number: JP19850156875 19850718
 Priority number(s): JP19850156875 19850718

Abstract

PURPOSE: To provide a water-based colloidal composition for preventing dental caries, by adding a fluoride having a solubility higher than a specific level, e.g. sodium fluoride, potassium fluoride, tin fluoride, zinc fluoride, etc. **CONSTITUTION:** The objective water-based colloidal composition for preventing dental caries is produced by adding one or more fluorides having a solubility of ≥ 1.5 g in 100ml of water at 20 deg.C such as sodium fluoride, potassium fluoride, tin fluoride, zinc fluoride, etc., to a dental impression material (agar impression material which is a reversible water-based colloid or an alginate impression material which is an irreversible water-based colloid). The effective concentration of the fluoride in the composition is preferably 2.0-6.0wt%. The composition is preferably an irreversible water-based colloid containing a fluoride and gelling in the oral cavity at 3.0-6.0 pH.

明細書

1.発明の名称

歯科用水成コロイド系歯牙ウ蝕予防組成物

Specification

1.Title of Invention

dental aqueous colloid tooth dental caries prevention composition

Claims

2.特許請求の範囲

1 歯科用印象材中に、20°Cにおける溶解度が、水 100ml に対し 1.5g 以上のフッ化ナトリウム、フッ化カリウム、フッ化スズ、フッ化亜鉛中の 1 種または 2 種以上のフッ化物を含有せしめたことを特徴とする歯科用水成コロイド系歯牙ウ蝕予防組成物。

2 歯科用印象材が可逆性水成コロイドの寒天印象材である特許請求の範囲第 1 項に記載の歯科用水成コロイド系歯牙ウ蝕予防組成物。3 歯科用印象材が不可逆性水成コロイドのアルギン酸塩印象材である特許請求の範囲第 1 項に記載の歯科用水成コロイド系歯牙ウ蝕予防組成物。

2.Claim (s)

In 1 dental impression material, 20 * solubility in, dental aqueous colloid tooth dental caries prevention composition, which designates that fluoride of one, two or more kinds in sodium fluoride, potassium fluoride, fluoride tin, zinc fluoride of 1.5 g or more is contained vis-a-vis water 100 ml as feature

dental aqueous colloid tooth dental caries prevention composition, which is stated in Claim 1 where the dental aqueous colloid tooth dental caries prevention composition, 3 dental impression material which is stated in Claim 1 where 2 dental impression material are agar impression material of reversibility aqueous colloid is alginate impression material of irreversible aqueous colloid

4 フッ化物を含む不可逆性水成コロイドが pH3.0 から 6.0 の範囲で口腔内でゲル化するものである特許請求の範囲第 3 項に記載の歯科用

水成コロイド系歯牙ウ蝕予防組成物。

Specification

3. 発明の詳細な説明

【産業上の利用分野】

本発明は歯科において歯牙組織のウ蝕抵抗性を強化し、歯牙ウ蝕を予防する目的で行なうフッ化物を歯面に付与するために用いるフッ化物を含む歯科用水成コロイド系歯牙ウ蝕予防組成物に関するものである。

【従来の技術】

フッ化物は歯牙のエナメル質や象牙質に取り込まれ、歯牙の耐酸性を強め、ウ蝕感受性を低下させると共に、ウ蝕発生の原因の 1 つであるウ蝕原性細菌の働きを抑制する効果があることからウ蝕予防薬として広く臨床的に応用されている。

フッ化物を臨床的に用いる方法としては

(1)

水道水のフッ素化

(2)

飲食物中へのフッ素添加

(3)

フッ化物の歯面塗布

(4)

歯みがき剤へのフッ素添加

(5)

フッ化物溶液による漱口

などがある。その中でフッ化物の歯面塗布は萌出直後またはウ蝕になる前の乳歯及び若年永久歯を対象として一般に歯科医院において行なわれている。

フッ化物の歯面への塗布方法としては歯面を清掃後、塗布する歯を中心に片顎または両顎を巻綿化で孤立させ、綿球で唾液を拭い、圧縮空気乾燥し、その後フッ化物溶液に浸した綿球、ガーゼなどで歯面を成るべく長い時間フッ化物溶液に浸漬させる一般的な方法や、歯面を清掃後、歯列弓に適合するトレーを選択し、このトレーの

irreversible aqueous colloid which includes 4 fluoride in range of pH 3.0 to 6.0 inside mouth cavity gelation dental which is stated in Claims Claim 3 which is something which is done

Aqueous colloid tooth dental caries prevention composition .

3. Detailed Description of Invention

[Field of Industrial Application]

this invention strengthens dental caries resistance of tooth tissue in dentistry , it is something regarding dental aqueous colloid tooth dental caries prevention composition which includes the fluoride which is used in order to grant fluoride which with objective which tooth dental caries prevention is done is done to teeth surfaces .

[Prior Art]

fluoride is taken in by enamel quality and dentin of tooth , strengthens acid resistance of tooth , is applied to clinical widely as it decreases, dental caries sensitivity as dental caries preventive from fact that it is the effect which controls function of dental caries field characteristic bacterium which is a one of cause of dental caries occurrence.

Uses fluoride for clinical as method which

(1)

fluorination of tap water

(2)

fluorine-added to in foods and beverages

(3)

teeth surfaces application of fluoride

(4)

fluorine-added to tooth polishing agent

(5)

With fluoride solution mouthwashing

Such as it is. Generally is done in dental office among those teeth surfaces application of fluoride themilk tooth and young permanent tooth, immediately after Moide or before becoming dental caries with as object .

As application method to teeth surfaces of fluoride teeth surfaces after cleaning , Tooth which application is done in center one jaw or both jaws being isolated with volumen cotton conversion, it wipes saliva with cotton ball , dries with compressed air , after that teeth surfaces with such as the cotton ball , gauze which is soaked in fluoride solution in order that it becomes, general method and teeth surfaces

大きさに合ったゴム袋、塗布紙をトレーにセットし、この塗布紙にフッ化物溶液を浸み込ませ、その後トレーを口腔内へ挿入し軟らかく歯列に圧接して約 4 分間噛ませるトレー法がある。更に、トレーに練和した印象材を盛り、口腔内に挿入して口腔内印象を採得した後、歯牙部印象内面にフッ化物を注入塗布してから口腔内印象を口腔内へ再度セットして約 4 分間保持してから撤去し、歯牙表面にフッ化物を付与する方法がある。

尚、印象採得した口腔内印象の歯牙部印象内面に先ず前もってリン酸溶液を注入し、その口腔内印象を口腔内へ戻し約 30~60 秒保持して、歯牙表面をリン酸溶液で脱灰する前処理をしておく、フッ化物の取り込み効果が向上することが公知である。その他イオン導入器を使用するイオン導入法などがある。

[発明が解決しようとする問題点]

しかし前述の様なフッ化物の歯面への塗布方法には次の様な問題点がある。

- (1)
酸味のあるフッ化物を唾液から完全に隔離することは不可能であり、患者に不快感、不快味を与える。
- (2)
多量のフッ化物を飲み込んでしまう危険性があり、嘔吐や腹痛を起こし、場合によってはフッ化物による中毒症状の発現の恐れがある。
- (3)
フッ化物の使用量が 3~4 才児で約 2g、小学生で約 5g と多く、また歯面に塗布するのに比較的時間が掛かる。
- (4)
トレー法においては専用トレー、ゴム袋、塗布紙などが必要であり、またトレーの大きさが限られていて歯列にトレーが適合し難いために歯頭部隣接面にフッ化物が完全に付着することが出来ない。
- (5)

which invasion arc done after cleaning , it selects the tray which conforms to dentition bow in long time fluoride solution , There is a tray method where set it does rubber bladder , application paper which is agreeable to size of this tray in tray , makes fluoride solution the this application paper soak , after that tray inserts to inside mouth cavity and presses softly in dentition and approximately 4 min * it can increase . Furthermore , after in tray to pile up impression material which kneading harmony is done , inserting into mouth cavity , after adopting impression inside mouth cavity , fill application doing fluoride in tooth section impression interior surface , set doing impression inside mouth cavity for second time to inside mouth cavity , after approximately 4 min keeping , there is a method which it withdraws , grants fluoride to tooth surface .

Furthermore when it fills phosphoric acid solution to tooth section impression interior surface of the impression inside mouth cavity which impression-taking is done first , in advance the impression inside mouth cavity resets to inside mouth cavity and approximately 30- 60 second keeps , tooth surface it does pretreatment which demetallization is done with phosphoric acid solution , fact that taking in effect of fluoride improves public knowledge . In addition there is a ion introduction method etc which uses ion injector .

[Problem That Invention Seeks to Solve]

But following way there is a problem in application method to teeth surfaces of fluoride an aforementioned way.

- (1)
fluoride which has acidic flavor isolating completely from saliva with impossible , gives discomfort , bad taste to patient .
- (2)
There is a risk which swallows fluoride of large amount , vomiting and abdominal pain happen , when depending , is a possibility of revelation of toxicosis condition with fluoride .
- (3)
amount used of fluoride with 3 - 4 years children approximately 5 g is many with approximately 2 g , small student , in addition time is required for teeth surfaces relatively in order application to do .
- (4)
dedicated tray , rubber bladder , application paper etc being necessary regarding tray method , in addition the size of tray being limited , because tray is difficult to conform to dentition fluoride cannot deposit completely in tooth head adjacent surface .
- (5)

イオン導入法ではイオン導入器が必要となり、また電流が唾液にリークしてフッ素が歯面に取り込まれ難い。

(6)

低年齢児(3才以下)に対してフッ化物を塗布することは安全性、操作上不安があり、使用不可能で現在使用されていない。

【問題点を解決するための手段】

之等の問題点を解決するため鋭意検討の結果、本発明者等は歯科用水成コロイド系印象材に着目し、この印象材にフッ化物を含有させて口腔内で硬化させ印象を得得する場合と同様に処置すればフッ化物を唾液から完全に隔離することが容易であり、またフッ化物を飲み込むことも全くなくなるため、低年齢児にも安全且つ容易に使用することが出来ることを見出した。

本発明に成るフッ化物含有の歯科用水成コロイド系歯牙腐蝕予防組成物としては可逆性水成コロイドと不可逆性水成コロイドとがある。

可逆性水成コロイドには寒天、ゼラチン、カラギーナンなどがあるが、60～70℃ではゾル状態を示し、ゲル化温度が37℃前後であり口腔内で支障無く使用されるものは寒天が最適であり、歯科用印象材として用いられている。市販の歯科用寒天印象材の組成は主成分として寒天と水であるが、ゾルとゲルに所要の性質を与えるため、寒天の濃度は8～15重量%で大部分は水である。更にその他歯科用印象材として所要の性質を与えるために種々の調節剤が含まれている。

ホウ酸塩は寒天のゲル強度を増すために通常0.1～1.0重量%加えられており、またゾル粘性も高くする性質がある。しかしホウ酸塩、特にホウ砂は石こうの硬化を遅延させるためホウ砂を加えた寒天印象材で採った印象に石こう泥を注ぎ石こう模型を作成する場合には石こうの硬化が抑制されるので石こう模型表面が粗雑になり、精密な模型が得られない。この欠点を除くために印象材の中にホウ酸塩と共に石こうの硬化促進剤、即ち硫酸塩が加えられている。

更に印象材のゾル粘性、可塑性、ゲル化温度を調節するために少量のケイソウ土、粘土、シリカ、多価金属の水酸化物または酸化物などの充填材、ワックス、ゴム、或いはチモール、グリセリンなどが加えられている。之に通常、香料と顔料とが含有されている。この様に歯科用寒天印

With ion introduction method ion injector becomes necessary, in addition current the leakage does in saliva and fluorine is difficult to be taken in by teeth surfaces.

(6)

What fluoride application is done in regard to safety, operation is a anxiety vis-a-vis low age child (Or less of 3 years), presently is not used with the unuseable.

[Means to Solve the Problems]

In order to solve Itaru or other problem, as for result and this inventor etc of diligent investigation you pay attention to dental aqueous colloid impression material, In this impression material containing fluoride, hardening inside mouth cavity, if the treatment it does in same way as case where it adopts impression fluoride being easy to isolate completely from saliva, because also in addition swallowing fluoride is gone completely, you discovered fact that it can use for also low age child safely and easily.

There is a reversibility aqueous colloid and a irreversible aqueous colloid as dental aqueous colloid tooth dental caries prevention composition of fluoride content which becomes this invention.

There is a agar, gelatin, carageenan etc in reversibility aqueous colloid, but 60 - 70 ° with sol state is shown, gelation temperature 37 ° at front and back are used without hindrance as for those which agar being optimum, is used inside mouth cavity as dental impression material. composition of commercial dental agar impression material is agar and water as main component, but in order [zoru] with to give necessary property to gel, as for the concentration of agar as for major portion it is water with 8 - 15 weight %. Furthermore various regulator is included in order to give necessary property in addition as dental impression material.

borate usually 0.1 - 1.0 weight % is added in order to increase the gel strength of agar, there is a property which in addition also [zoru] viscosity makes high. But borate, especially borax in order hardening gypsum delay to do, to pour gypsum mud to impression which was searched with the agar impression material which adds borax, when gypsum cast is drawn up, because hardening gypsum is controlled, gypsum cast surface becomes rough, precision cast is not acquired. In order to exclude this deficiency with borate curing promoter, namely the sulfate of gypsum is added in impression material.

Furthermore hydroxide or oxide or other packing, wax, rubber, or thymol, glycerin etc of diatomaceous earth, clay, silica, polyvalent metal of trace is added in order to adjust [zoru] viscosity, plasticity, gelation temperature of impression material. Usually, fragrance and pigment are contained in Itaru. this way as for dental agar impression

素材は口腔内温度でゲル化することを利用して安全、精密且つ容易に印象を採得することが出来、現在広く歯科医によって用いられている。印象を採得するのは2~5分間であり、飲み込むことも無く、安全、確実であり且つ歯牙表面に正確に密着させることが可能であることに本発明者等は注目し、このゾル、ゲル現象を利用してこの可逆性水成コロイドにフッ化物を加えて歯牙ウ蝕予防組成物を創製したものである。

本発明の目的はウ蝕予防であって、口腔内の印象を採得するのが目的ではない。

しかし適度なゾル粘性、可塑性、ゲル化温度、ゲル強度が必要であるためにホウ酸塩、充填剤などの調節剤が加えられる。

本発明の目的は印象を採って石膏模型を作成することではないので、特に硫酸塩を加えることは必要ではないが、加えても支障はない。歯牙ウ蝕予防組成物に用いられるフッ化物は、フッ化ナトリウム、フッ化カリウム、フッ化スズ、フッ化亜鉛などの溶解度が20°Cにおいて水100mlに対し1.5g以上を示すものに限定される。

即ち溶解度が水100mlに対し1.5g未満のフッ化物は本発明の目的である歯牙ウ蝕予防に効果を発揮させるために歯牙表面にフッ化物を有効的に取り込ませるには不十分であり不適当である。フッ化物の有効温度は2.0~6.0重量%が適当であり、6.0重量%を超えるとゲル化特性の調整が困難になり不適当である。2.0重量%未満の濃度では歯牙表面へのフッ素の取り込み量が少なくウ蝕予防効果が薄い。更には、フッ化物を加えた可逆性水成コロイドにリン酸並びにその酸性塩、或いはクエン酸などの有機酸を加えることにより歯牙表面にフッ化物をより多く取り込むことが出来る。本発明のフッ化物を加えた可逆性水成コロイド系歯牙ウ蝕予防組成物は歯科用に用いられている寒天印象材と同じく、スティック状のゲルとして歯科医に供給するものであって寒天印象材の使用と全く同じ方法で取扱うことが出来る。即ち歯科で用いられている専用シリンジにフッ化物を加えた可逆性水成コロイドを通常の方法で装填する。シリンジを適当なバスの95~100°C沸騰水に入れ可逆性水成コロイドを加熱軟化(ゾル化)させた後、バスにて60°Cに暴留してシリンジをバスから取り出し歯牙表面に注入する。

歯牙表面に注入されたフッ化物を加えた可逆性水成コロイドがゾル状態のうちに歯科用寒天印象材または歯科用アルジネート印象材をトレ

material safety, it is possible making use of fact that gelation it does with mouth cavity internal temperature, presently is used widely with dental medicine to adopt impression in precision and easy. That impression is adopted, with 2 - 5 min, being safe and secure swallowing without, and it observes this inventor etc to being possible to stick to tooth surface accurately, this [zoru], making use of gel phenomenon it is something which tooth dental caries prevention composition new preparation is done in this reversibility aqueous colloid including fluoride.

objective of this invention with dental caries prevention, adopting impression inside the mouth cavity is not objective.

But it can add borate, filler or other regulator because suitable [zoru] viscosity, plasticity, gelation temperature, gel strength is necessary.

Because, objective of this invention taking impression, is not to draw up gypsum cast, it is not necessary to add especially sulfate. In addition there is not a hindrance, fluoride which is used for tooth dental caries prevention composition sodium fluoride, potassium fluoride, fluoride tin, zinc fluoride or other solubility 20 * in is limited in those which show 1.5 g or more vis-a-vis water 100 ml.

Namely solubility fluoride under 1.5 g to make fluoride tooth surface take in effectively in order to show effect in tooth dental caries prevention which is a objective of this invention, is inadequate with unsatisfactory vis-a-vis water 100 ml. As for effective temperature of fluoride 2.0 - 6.0 weight % being suitable, when it exceeds 6.0 weight %, adjustment of gelation characteristic becomes difficult and it is inadequate. 2.0 With concentration under weight % amount taken up of fluorine to the tooth surface to be little dental caries preventive effect is thin. Furthermore, it is possible to take in fluoride more in tooth surface, by adding phosphoric acid and acid salt, or citric acid or other organic acid to reversibility aqueous colloid which adds fluoride. Being something which is supplied to dental medicine agar impression material which is used for dental and similarly, as gel of stick can reversibility aqueous colloid tooth dental caries prevention composition which adds fluoride of this invention handle with the completely same method as use of agar impression material. Namely reversibility aqueous colloid which adds fluoride to dedicated syringe which is used with dentistry loading is done with conventional method. You insert syringe in 95 - 100 * boiling water of suitable bus and reversibility aqueous colloid after heat softening ([zoru] conversion), 60 * moor with bus and remove syringe from bus and fill to tooth surface.

reversibility aqueous colloid which adds fluoride which was filled in the tooth surface piling up dental agar impression material or dental [arujineeto] impression material to tray

に盛って圧接し、硬化後(フッ化物を加えた可逆性水成コロイドを歯牙表面に注入し、印象材をトレーに盛って圧接中にフッ化物が歯牙表面に取り込まれる。)、口腔内から撤去する。この様に可逆性水成コロイドを利用して安全且つ確実にフッ化物を歯牙表面に付与することが出来、低年齢児(3才以下)にも用いることが出来、従来に全く存在していない方法を確立したものである。

フッ化物を加えた歯科用水成コロイド歯牙ウ蝕予防組成物として不可逆性水成コロイドにはアルギン酸、カルボキシメチルセルロース、ポリアクリル酸、カラギーナンなどの水溶性アルカリ塩が用いられる。不可逆性水成コロイドは化学反応によってゾルからゲルに変化して固まり、熱によってはゾルに戻らない。この不可逆性水成コロイドを利用して歯科用として適性な硬化特性、操作性、粘性、ゲル強度があり、印象精度及び石膏との適合性の良いアルギン酸塩印象材が用いられている。歯科用アルギン酸塩印象材の公知の組成は、アルギン酸カリウムまたはナトリウムに硬化剤として硫酸カルシウム、及び2価以上の金属の酸化物または水酸化物、2価以上の金属の硅酸塩、充填剤としてケイソウ土、ホワイトカーボンを加え、アルジネートゲルの強さと剛さを増加し、アルジネートの粉末粒子を水によく分散させて操作性を改善し、リン酸ナトリウム、炭酸ナトリウムなどのアルカリ性金属塩の遅延剤によってアルジネートのゲル化時間を、1.5分～8分間に調整している。

更に、アルギン酸塩印象材で採得した口腔内印象に石膏を注入して石膏模型を作成する際に石膏表面を硬くて緻密なものにするために、フッ化チタンカリウム、フッ化チタンナトリウム、ケイフッ化ナトリウム、ケイフッ化カリウム、ジルコンフッ化カリウムなどのフッ化物の錯塩が加えられている。

従来用いられているこのフッ化物の錯塩は本発明の歯牙ウ蝕予防を目的に用いるフッ化物の溶解性の高い電解質とは異なり、錯体で溶解度が水 100ml に対し 1.0g 以下(20℃)の比較的難溶性塩類を指向し、歯牙ウ蝕予防に効果的な歯牙表面にフッ化物を付与することを目的としたものではない。従って、本発明は歯牙ウ蝕予防に効果的なフッ化ナトリウム、フッ化カリウム、フッ化スズ、フッ化亜鉛などの溶解度が 20℃において水 100ml に対し 1.5g 以上の溶解性の高い電解質のフッ化物を 2.0～8.0 重量%加える。溶解度が水 100ml に対し 1.5g 以下のフッ化物は歯牙表面にフッ化物を有効に取り込ませるに不充分であり、またフッ化物の濃度が 2.0 重量%

among the sol state, you press, after hardening (reversibility aqueous colloid which adds fluoride is filled to tooth surface, impression material piles up to tray and fluoride is taken in to tooth surface in pressure.), withdraw from inside mouth cavity. this way, it is something which establishes method where it is possible, to grant fluoride to tooth surface safely and securely making use of reversibility aqueous colloid it is possible, completely does not exist former to use for also low age child (Or less of 3 years).

It can use to irreversible aqueous colloid alginic acid, carboxymethyl cellulose, polyacrylic acid, carrageenan or other water solubility alkali salt as dental aqueous colloid tooth dental caries prevention composition which adds fluoride. irreversible aqueous colloid with chemical reaction from [zoru] changing in the gel, at aggregate, heat does not return to [zoru]. Making use of this irreversible aqueous colloid suitability there is a curing characteristic, operability, viscosity, gel strength as dental, alginate impression material where compatible of impression precision and gypsum is good is used. composition of public knowledge of dental alginate impression material as curing agent strength and the stiffness of [arujineetogeru] increases in potassium alginate or sodium including the diatomaceous earth, white carbon as silicate, filler of metal of oxide or hydroxide, bivalent or greater of metal of calcium sulfate, and bivalent or greater, disperses powder particle of [arujineeto] to water well and improves operability, adjusts gelling time of [arujinecto], 1.5 min ~ 8 min with the retardant of sodium phosphate, sodium carbonate or other alkaline metal salt.

Furthermore, filling gypsum to impression inside mouth cavity which is adopted with alginate impression material, when drawing up gypsum cast, gypsum surface being hard, in order to make dense ones, complex salt of fluoride titanium potassium, fluoride titanium sodium, sodium silicofluoride, potassium silicofluoride, zircon potassium fluoride or other fluoride is added.

It is not something which designates that solubility 1.0 g or less (20 °) points poorly soluble salts relatively with complex vis-a-vis water 100 ml complex salt of this fluoride which is used until recently unlike the electrolyte where lytic of fluoride which uses tooth dental caries prevention of this invention for objective is high, grants fluoride to effective tooth surface in tooth dental caries prevention, as objective. Therefore, this invention in tooth dental caries prevention effective sodium fluoride, potassium fluoride, fluoride tin, zinc fluoride or other solubility 20 * in fluoride of the electrolyte where lytic of 1.5 g or more is high vis-a-vis water 100 ml is added 2.0 - 8.0 weight %. When solubility as for fluoride of 1.5 g or less when tooth surface take in fluoride makes with unsatisfactory, in addition concentration of

未満の場合は歯牙表面のフッ素の取込み量が少なく、歯牙防蝕効果が薄く、8.0重量%を超えるとアルギン酸塩のゲル化特性の調整が不可能となるため適当でない。尚、本発明においては硫酸カルシウムなどの硬化剤の量を従来の2~4倍量を用いて適正な硬化特性とゲル強さを有し、歯牙表面にフッ化物を付与し、効果的な不可逆性水成コロイド系歯牙防蝕組成物を生じた。

更に、このフッ化物を加えた不可逆性水成コロイド系歯牙防蝕組成物を歯牙圧接時 pH3~6 の酸性側で硬化するように遅延剤として酸性ピロリン酸ナトリウム、酸性トリポリリン酸ナトリウム、酸性リン酸ナトリウムなどと共に珪酸亜鉛を加えることによって適正な硬化物性とゲル強度を有し歯牙表面にフッ化物を多量に取り込ませることの出来る不可逆性水成コロイド系歯牙防蝕組成物を創製した。また、術者が本発明の不可逆性水成コロイド系歯牙防蝕組成物を練和してトレーに盛り、口腔内に挿入して口腔内印象を採得した後、この印象をトレーとして歯牙部印象内面に APF ゲル(酸性リン酸フッ素ゲル)等のフッ化物を少量注入し、口腔内へ再度セットして約4分間保持してから撤去し、歯牙表面にフッ化物を付与することもできる。

この方法は、従来に比較して、約1/3~1/10量の極めて少量のフッ化物を用いて、より効果的にフッ化物を歯面に付与することが出来る。

【作用】

本発明に成る水成コロイド系歯牙防蝕組成物によって歯牙表面にフッ化物を付与する方法によれば、トレーに盛った水成コロイドがフッ化物を包み込みゲル化して安全に撤去することが容易であるため、フッ化物を唾液から完全に隔離することが出来、患者がフッ化物を飲み込むことが無くなり、且つフッ化物による不快感や不快味を受けることも無くなる。

また、フッ化物を歯牙面全体に確実に短時間(約4分間)に接触させることが出来るため、従来フッ化物の歯面塗布が難しいとされていた3才以下の子供にあっても容易に処置出来る様になった。

fluoride is under 2.0 weight % effectively, taking in quantity of fluorine of tooth surface to be small dental caries preventive effect is thin vis-a-vis water 100 ml, exceeds 8.0 weight % because adjustment of gelation characteristic of alginic acid * becomes impossible, it is not suitable. Furthermore regarding to this invention, it possessed proper curing characteristic and the gel strength quantity of calcium sulfate or other curing agent making use of conventional 2~4-fold amount, granted the fluoride to tooth surface, discovered effective irreversible aqueous colloid tooth dental caries prevention composition.

Furthermore, in order irreversible aqueous colloid tooth dental caries prevention composition which adds the this fluoride at time of tooth pressure to harden with acid side of the pH 3~6 acidic sodium propionate, acidity sodium tripolyphosphate, acidity sodium phosphate etc and also it possessed proper curing property and gel strength by fact that zinc silicate is added as retardant and new preparation it did the irreversible aqueous colloid tooth dental caries prevention composition which can make fluoride large amount take in tooth surface. In addition, surgeon kneading harmony doing irreversible aqueous colloid tooth dental caries prevention composition of this invention, to pile up to tray, inserting into mouth cavity, after adopting impression inside mouth cavity, trace to fill APF gel (acidity phosphoric acid fluorine gel) or other fluoride in tooth section impression interior surface with this impression as tray, the set doing for second time to inside mouth cavity, after approximately 4 min keeping, it withdraws, It is possible also to grant fluoride to tooth surface.

It is possible making use of fluoride of quite trace of approximately 1/3 - 1/10 quantity, as for this method, by comparison with past, from to grant fluoride to teeth surfaces in effective.

【Working Principle】

According to method which grants fluoride to tooth surface with the aqueous colloid tooth dental caries prevention composition which becomes this invention, aqueous colloid which you piled up to tray to wrap fluoride and gelation do and because it is easy, to withdraw safely, fluoride to isolate completely from saliva, to be possible patient swallowing fluoride is gone, also at same time receiving discomfort and bad taste with fluoride is gone.

In addition, fluoride because it is possible, to contact certainly and short time (Approximately 4 min) in tooth entire surface, being in child of 3 years children or less, is assumed that teeth surfaces application of fluoride is difficult until recently, easily it became way which treatment it is possible.

更に歯科医が診療時に通常行なっている口腔印象の採得と何等変わらないため、特別な専用器具を準備する必要もない。

【実施例】

以下、実施例に基づいて更に詳しく本発明を説明する。

次に示す実施例及び比較例について抜去歯牙表面のフッ素の取込み量を測定し、總めて表に示した。またコントロールとして天然歯牙に含まれているフッ素量も表示した。抜去歯牙表面のフッ素の取り込み量はエナメル歯牙 1 μ g 当りのフッ素量を ppm 単位で表示した。

実施例 1

重量部寒天

10.0

フッ化ナトリウム(20°Cでの溶解度水 100ml に対し 4.2g)

5.0

ホウ砂

0.2

水酸化アルミニウム

0.8

水

84.0

上記成分をニーダー中で 20 分間加熱(100°C)混練を行なった。このものを内径 7.5mm のチューブに入れ水冷して後、取り出して約 5.5cm に裁断してゲル状歯牙ウ蝕予防組成物を作製した。

得られた寒天ゲルを歯科に用いられている寒天用シリンジに挿入し密閉して、沸騰水中に 10 分間入れて溶解して後、60°Cの加温水槽中に 10 分間以上浸漬し、次いで歯牙表面に注入した。

歯科用アルジネート印象材の粉末 16.8g を水 40 cc で 30 秒間練和してトレーに盛って先きに歯牙表面に注入した寒天ゾルの上から覆って 4 分間放置してゲル化物を撤去した。抜去歯牙表面のフッ素の取込み量を測定した結果 7400ppm であった。

実施例 2

重量部アルギン酸カリウム

Furthermore because what etc it is not different from adoption of mouth cavity impression which dental medicine usually does when diagnosing and treating, it is not necessary to prepare special dedicated tool.

[Working Example (s)]

Furthermore this invention is explained in detail below, on basis of Working Example.

It measured taking in quantity of fluorine of removal tooth surface concerning Working Example and Comparative Example which is shown next, collected and showed in the chart. In addition it indicated also fluorine amount which is included in natural tooth fang as control. amount taken up of fluorine of removal tooth surface indicated fluorine amount per enamel tooth 1 μ g with ppm unit.

Working Example 1

parts by weight agar

10.0

sodium fluoride (20 * with vis-a-vis solubility water 100 ml 4.2 g)

5.0

borax

0.2

aluminum hydroxide

0.8

Water

84.0

Above-mentioned component 20 min heating (100 *) kneading were done in the kneader. Inserting this in tube of inner diameter 7.5mm and water cooling doing and after, removing cutting off in approximately 5.5 cm, it produced gel tooth dental caries prevention composition.

Inserting in syringe for agar and which has been used agar gel which it acquires for dentistry closing airtight, 10 min inserting in boiling water melting, after, 60 * 10 min or longer it soaked in hot water tank, filled to tooth surface next.

30 second kneading harmonics doing powder 16.8g of dental [arujineeto] impression material with water 40 cc, piling up to tray, being covered from on the agar [zoru] which it filled to tooth surface ahead 4 min leaving, it withdrew gelled product. It was a result 7400 ppm which measured taking in quantity of fluorine of removal tooth surface.

Working Example 2

parts by weight potassium alginate

15.0

硫酸カルシウム 2 水塩

20.0

フッ化カリウム(20°Cでの溶解度水 100ml に対し 9.6g)

5.5

第 3 リン酸ナトリウム

2.0

ケイソウ土

57.5

上記成分をブレンダー中で混合し、粉末状歯牙ウ蝕予防組成物を作製した。

得られた粉末 16 部と水 40 部とをゴム製ボールに採りスパチュラを用いて練和した後、ペーストをトレーに盛り抜去歯牙面に圧接し、4 分間放置してゲル化物(印象)を撤去した。抜去歯牙表面のフッ素の取込み量を測定した結果、3000ppm であった。

実施例 3

重量部アルギン酸ナトリウム

14.0

硫酸カルシウム 2 水塩

18.0

酸性ピロリン酸ナトリウム

2.0

珪酸亜鉛

4.0

フッ化ナトリウム(20°Cでの溶解度水 100ml に対し 4.2g)

6.0

ケイソウ土

56.0

実施例 2 の第 3 リン酸ナトリウムを酸性ピロリン酸ナトリウムに代え、更に珪酸亜鉛を加えた上記成分をブレンダー中で混合し、粉末状酸性歯牙ウ蝕予防組成物を作製した。得られた粉末 17 部と水 40 部とをゴム製ボールに採り、スパチュラを用いて練和した後、ペーストをトレーに盛り抜去歯牙面に圧接し 4 分間放置してゲル化物(印象)を撤去した。抜去歯牙表面のフッ素の取

15.0

calcium sulfate dihydrate

20.0

potassium fluoride (20 * with vis-a-vis solubility water 100 ml 9.6 g)

5.5

third sodium phosphate

2.0

diatomaceous earth

57.5

Above-mentioned component was mixed in blender, powder tooth dental caries prevention composition was produced.

It took powder 16 section and water 40 section which it acquires in rubber ball and it piled up Satoshi and paste which kneading harmony are done to tray making use of spatula and pressed on removal tooth aspect, 4 min left and withdrew gelled product (impression). It was a result and 3000 ppm which measured [futsu] Qin's of removal tooth surface taking in quantity.

Working Example 3

parts by weight sodium alginate

14.0

calcium sulfate dihydrate

18.0

acidic sodium propionate

2.0

silicic acid zinc

4.0

sodium fluoride (20 * with vis-a-vis solubility water 100 ml 4.2 g)

6.0

diatomaceous earth

56.0

third sodium phosphate of Working Example 2 was replaced to acidic sodium propionate, furthermore the above-mentioned component which adds silicic acid zinc was mixed in blender one, the powder acidity tooth dental caries prevention composition was produced. It took powder 17 section and water 40 section which it acquires in rubber ball, kneading harmony after doing, it piled up paste to tray making use of spatula and pressed on removal tooth aspect

込み量を測定した結果 3500ppm であった。

比較例 1

歯面を清掃後、塗布する歯を中心に巻綿化で防湿し、圧縮空気で乾燥し、その後 2%フッ化ナトリウム溶液に浸した綿球で歯面に塗布した、抜去歯牙のフッ素取込み量を測定した結果、3400 ppm であった。

比較例 2

歯面を清掃後、フッ化物塗布用トレー、ゴム袋、塗布紙を選択し、この塗布紙に酸性フッ素リン酸溶液(商号名、フロアーゲル;プレミアデンタル社製)を筆で塗布注入し、これを抜去歯牙にセットし約 4 分間保持し、その後トレーを外すし、残留した酸性フッ素リン酸溶液をガーゼで拭き取った。歯牙表面のフッ素取込み量を測定した結果 7100ppm であった。

and 4 min left and withdrew gelled product (Impression). It was a result 3500 ppm which measured taking in quantity of fluorine of removal tooth surface.

Comparative Example 1

It was a result and 3400 ppm where teeth surfaces after cleaning, in the center moisture-proofing it did tooth which application is done with volumencotton conversion, dried with compressed air, with cotton ball which soaked in sack 2% sodium fluoride solution application it did in teeth surfaces, measured fluorine taking in quantity of removal tooth.

Comparative Example 2

teeth surfaces after cleaning, it selected tray, rubber bladder, application paper for fluoride application, in the this application paper application filled acidity fluorine phosphoric acid solution (Trade quantitative name, floor gel; [puremiadentaru] supplied) with writing brush, set did this in removal tooth and approximately 4 min kept, afterthat outside * did tray, it wiped off acidity fluorine phosphoric acid solution which remainswith gauze. It was a result 7100 ppm which measured fluorine taking in quantity of tooth surface.

	抜去歯牙表面への フッ素の取込み量 (ppm)
実施例 1	7 4 0 0
" 2	3 0 0 0
" 3	3 5 0 0
比較例 1	3 4 0 0
" 2	7 1 0 0
コントロール(天然歯牙)	2 0 0 0

※[抜去歯牙表面へのフッ素の取込み量の測定法 Window 法:サンプル(φ5.5mm)1 を 0.5M 過塩素酸(1cc)中に 10 秒間入れ脱灰し、0.5M クエン酸三ナトリウムを 4cc 加え、オリオン 901(電極:オリオン複合電極 96-09)のイオンメーターを用いてフッ素量を測定した。表の結果より明らかな

measurement method Window method:sample of taking in quantity of fluorine to theremoval tooth surface (ph 5.5 mm) 1 10 second inserting demetallization was done in 0.5 Mperchloric acid (1 cc),0.5 Mtrisodium citrate 4 cc were added, fluorine amount was measured making use of the ion meter of Orion 901 (electrode :Orion compound electrode

様に本発明のフッ化物を加えた水成コロイド系歯牙ウ蝕予防組成物を用いる方法は従来のフッ化物の歯面塗布方法に比べてフッ化物の使用量が少ないにも拘わらず確実に歯面全体にフッ化物を付与し、フッ素の取込み量が同等以上であり、且つ歯科用印象材と同様簡単に取り扱い出すことが出来、ゲル化するためにフッ化物の流出量が極めて少ない。

【発明の効果】

本発明のフッ化物を加えた歯科用水成コロイド系歯牙ウ蝕予防組成物を用いて歯牙表面にフッ素を付着する方法は

(1)

歯科用印象材による印象採得と同じ手法により、水成コロイド系歯牙ウ蝕予防組成物を口腔内に挿入し、ゲル化させることにより、簡単、容易に且つ確実に歯牙表面にフッ化物を付与することが出来る。

(2)

ゲル生成物から唾液へのフッ化物の浸出量は極めて少ないため、不快感、不快味を感じることも少ない。

(3)

水成コロイドがゲル化し、完全に撤去されるためフッ化物を誤飲することも無くなり、且つフッ化物の使用量が比較的少なくて済む。

(4)

患者にとっては非常に安全且つ安心感のある方法であり、低年齢児でも行なうことが出来る。

(5)

歯科医にとっては何等特殊な器具、術式も必要とせず、容易に行なえる。

従って本発明はウ蝕予防効果に優れたフッ化物を加えた水成コロイド系歯牙ウ蝕予防組成物であると言える。

特許出願人

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96-09). In order to be clearer than result in chart, as for method which uses aqueous colloid tooth dental caries prevention composition which adds fluoride of this invention amount used of fluoride is less to grant fluoride to teeth surfaces entirety although securely in comparison with teeth surfaces application method of conventional fluoride, the taking in quantity of fluorine being same or greater, at same time to be able handle in same way as dental impression material simply, outflowing amount of fluoride quite is little in order gelation to do. *

[Effects of the Invention]

Making use of dental aqueous colloid tooth dental caries prevention composition which adds fluoride of this invention in tooth surface fluorine deposits as for method which

(1)

It inserts aqueous colloid tooth dental caries prevention composition into mouth cavity with dental impression material ducto same technique as impression-taking, simply, easily and it is possible by gelation doing, securely to grant fluoride to tooth surface.

(2)

leaching quantity of fluoride to saliva because quite it is little, feeling discomfort, bad taste is small from gel production ones.

(3)

Aqueous colloid does gelation, because it is withdrawn completely, also what fluoride mis-ingestion is done is gone, at same time the amount used of fluoride may be little relatively and.

(4)

With method which is safe and calmness in unusual for patient, it is possible to do even with low age child.

(5)

For dental medicine special tool, surgical such as what does not need, can do easily.

Therefore as for this invention you can say that it is an aqueous colloid tooth dental caries prevention composition which adds fluoride which is superior in dental caries preventive effect.

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Drawings